

WE CLAIM:

1. An arrangement for electro-optically reading indicia having parts of different light reflectivity, comprising:
 - a) a variable optical lens having a pair of light-transmissive liquids arranged along an optical path, the liquids being immiscible, of different optical indices of refraction, and of substantially same density, one of the liquids having a shape in a rest state for optically modifying light passing through said one liquid along the optical path toward the indicia to have a first optical characteristic; and
 - b) a controller for applying a voltage across said one liquid to change the shape thereof, and for optically modifying the light to have a second different optical characteristic.
2. The arrangement of claim 1; and a light source for emitting the light to the variable lens; and wherein the first and second optical characteristics are different focal planes spaced apart along the optical path at different working distances relative to the variable lens.
3. The arrangement of claim 2, wherein the light source is a laser for emitting the light as a laser beam.
4. The arrangement of claim 1; and a sensor for receiving the light from the variable lens; and wherein the first and second optical characteristics are different imaging planes spaced apart along the optical path at different working distances relative to the variable lens.
5. The arrangement of claim 4, wherein the sensor is an array of imaging cells.
6. The arrangement of claim 1; and a scanner for scanning at least one of the light, and a field of view, over the indicia.

7. The arrangement of claim 6, and wherein the controller is operative for continuously applying the voltage as a periodic voltage during scanning.

8. The arrangement of claim 6; and an analyzer for determining whether the indicia was successfully scanned and read, and wherein the controller is operative for applying the voltage upon a determination that the indicia was not successfully scanned and read.

9. The arrangement of claim 1, wherein said one liquid is electrically insulating, and wherein the other of the liquids is electrically conductive, and wherein a first electrode is disposed at one side of said one liquid, and wherein a second electrode is immersed in said other liquid at an opposite side of said one liquid, and wherein the voltage is applied across the electrodes.

10. The arrangement of claim 1, wherein the variable lens includes at least one fixed focal lens spaced apart from the liquids along the optical path.

11. The arrangement of claim 10, wherein there are two fixed focal lenses having positive and negative optical powers respectively, and wherein the two fixed focal lenses are located at opposite ends of the variable lens.

12. The arrangement of claim 9, wherein the variable lens has an electrically insulating wall on which said one liquid rests, and wherein the second electrode contacts the insulating wall.

13. The arrangement of claim 1, wherein said one liquid is radially symmetrical about the optical path in the rest state.

14. The arrangement of claim 1, wherein said one liquid extends along a transverse axis generally perpendicular to the optical path and optically modifies a cross-section of the light passing through said one liquid.

15. A method of electro-optically reading indicia having parts of different light reflectivity, comprising the steps of:

a) arranging a pair of light-transmissive liquids along an optical path to form a variable optical lens, the liquids being immiscible, of different optical indices of refraction, and of substantially same density, one of the liquids having a shape in a rest state for optically modifying light passing through said one liquid along the optical path toward the indicia to have a first optical characteristic; and

b) applying a voltage across said one liquid to change the shape thereof, and optically modifying the light to have a second different optical characteristic.

16. The method of claim 15, and the step of emitting the light to the variable lens; and wherein the first and second optical characteristics are different focal planes spaced apart along the optical path at different working distances relative to the variable lens.

17. The method of claim 15, and the step of receiving the light from the variable lens; and wherein the first and second optical characteristics are different imaging planes spaced apart along the optical path at different working distances relative to the variable lens.

18. The method of claim 15, and the step of scanning at least one of the light, and a field of view, over the indicia.

19. The method of claim 18, and the step of continuously applying the voltage as a periodic voltage during scanning.

20. The method of claim 18, and the step of determining whether the indicia was successfully scanned and read, and the step of applying the voltage upon a determination that the indicia was not successfully scanned and read.